

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin active scattering at the interface between a metal and a topological insulator ERHAI ZHAO, George Mason University, CHUN ZHANG, National University of Singapore, MAHMOUD LABABIDI, George Mason University — We present theoretical results for the spin-active scattering and local spectrum at the interface between a metal and a three-dimensional topological band insulator. We show that there exists a critical incident angle at which complete (100%) spin flip reflection occurs and the spin rotation angle jumps by π . We discuss the origin of this phenomena, and systematically study the dependence of spin-flip and spin-conserving scattering amplitudes on the interface transparency and metal Fermi surface parameters. The interface spectrum contains a well-defined Dirac cone in the tunneling limit, and smoothly evolves into a continuum of metal induced gap states for good contacts. We also investigate the complex band structure of Bi_2Se_3 .

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Date submitted: 18 Nov 2010

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